NAE Comments on Phase III Remedial Action Plan RTN 4-601 Former Aerovox Facility, New Bedford, MA

General Comments

DNAPL – The occurrence of DNAPL in the Site overburden and its potential impact on remedial approach receives very limited discussion; it is not even included in the description of OU3. The figures of DNAPL area and cross section presented in Appendix A show a small DNAPL footprint contained within the site boundaries that is quite reduced over what had been presented previously by URS (October 2014) and does not include the area more recently identified by MIP-53 and MIP-54. There is no supporting discussion on the rationale for the reduction of the DNAPL zone area. It is unclear why the accepted characterization guidance of Kueper and Davies (2009) of defining a confirmed/probable source zone and potential source zone has not been used to help inform the remedial alternatives assessment.

OU-3 Remedy Effectiveness - Remedies that include groundwater pumping and treating as a significant element of the remedy should not be considered as having a moderate or high likelihood of achieving a permanent solution. The presence of DNAPL or the significant matrix diffusion will act as a continuing and long-term source of dissolved contaminants. Complete source remediation is required to achieve a site status that would allow termination of the need to capture and treat groundwater.

The selected remedy for OU-3 includes a PRB, constructed almost as a "funnel-and-gate" system with impermeable vertical barriers preventing flow around the PRB. However, industry experience has shown that funnel-and-gate systems do not reliably direct groundwater flow through the PRB (i.e., "gate"). Therefore, effective installation of the PRB would likely require a longer PRB than assumed in the FS.

In recent years, zero-valent ion (ZVI) barriers have been shown to not last as long as previously thought (typically assumed to last for at least 30 years). It should not be assumed that a ZVI barrier will work and persist without significant testing to ensure that the groundwater geochemical conditions will not result in passivation or clogging of the ZVI and degradation of the efficacy of the iron. In light of this concern, the Corps recommends bench-scale testing of ZVI before selection of this remedy in the Phase III FS; pilot testing of the wall is not the most effective method of evaluating this proof of concept. Also, should the PRB begin to clog or experience a reduction of permeability, then greater downward vertical gradients can develop behind the PRB, resulting in more downward flow into the bedrock (and expected discharge to the harbor further downgradient), circumventing the containment system.

The selected remedy for OU3B includes biological remediation of the source soils which contain both mobile and residual DNAPL. Further, this DNAPL is a mixture of CVOCs and PCBs. Enhanced reductive dechlorination (ERD) is not guaranteed to eliminate all of the DNAPL within this zone, certainly not within the projected timeframe of "approximately 10 years". Thus, control of the flux COCs from the site should be assumed to be needed for more than 10 years. In Section 6.3.2, the Remedial Action Plan recognizes that replacement of the PRB may be required over the lifetime of the remedy. However, there is no estimate of the number of times refreshing the PRB will be required. There do not appear to be costs included in the estimates for refreshing the PRB in the rating of this alternative. It appears that the ERD remedy for OU3 groundwater is expected to reduce the PCB concentrations within the deep overburden. (Bullet 4 in Section 2.4.1 states that PCBs in soils around MW-15D exceed the PCB UCL.) However, PCBs are not reliably remediated using ERD. Thus, it is unlikely that the selected remedy, OU3-B4, will achieve a permanent solution. Is there an expectation that the PCB contained in the DNAPL will be treated via another mechanism than ERD?

Existing Sheet Pile Wall – The existing sheet pile wall is described as functioning to limit the connection of the shallow groundwater system and surficial site soils with waters of the Upper Harbor, a key component given the selected alternative to cap site soils in place. However, there is no discussion about the age of the wall (installed in 1983-84); its expected condition after more than three decades in a marine environment; and its expected ability to contain site soils, groundwater, and separate phase product as part of a permanent solution for the Site.

Interface with the Harbor Remediation – There is almost no mention of the ongoing remediation of harbor sediments by EPA, particularly the well-communicated fact that a significant amount of sediment directly adjacent to the Site is scheduled for removal. This needs to be taken into consideration when evaluating the type of barrier installed along the eastern Site boundary, i.e., is the geotechnical stability of a new barrier compatible with shoreline dredging. If a vertical barrier is installed as a part of the remedy, it will be important for the construction of the vertical barrier to include structural elements that will ensure that the wall maintains its integrity during implementation of the harbor excavation. The specific location of that barrier needs to be considered as well; if it is installed landward of the existing sheet pile wall, what is the intended plan for the material between the two barriers. Nearly all of this area is considered within a confirmed or potential DNAPL zone, i.e. even a relatively narrow band is expected to contain a significant amount of contamination that would eventually be released to the harbor if not removed or fully contained.

Long Term Impacts to the Harbor – The discussion on OU4 includes calculation of potential impacts to harbor pore water from the discharge of contaminated bedrock groundwater. The calculation is presented as a single, steady state concentration, with the implied assumption that the pore water discharges to surface water and then leaves the system. Although not explicitly stated in the text, the calculation presented in Appendix B estimates that over 260 pounds of TCE (along with an unspecified mass of associated PCBs) would be released annually into harbor pore water. Given the high organic content of estuarine sediments, contaminants entering the sediment pore water system via groundwater discharge are expected to preferentially bind to the organic matter resulting in recontamination of harbor sediments.

Specific Comments

Page 2-4, third bullet under 2.4.1 – What is the basis for the statement that PCBs are "largely absorbed to surface soils" without an accounting of the mass as separate phase product?

Page 2-4, third bullet under 2.4.1 – How is the PCB and CVOC plume considered "late stage" if TCE (the product used on site) is present in some of the highest concentrations? The concentrations of TCE in some of the wells (e.g., 15B, 17B, 34B) are all high enough to indicate that they are proximate to DNAPL in the subsurface, which would not be consistent with the characterization as a late stage plume.

Page 2-5, fourth, fifth, and sixth bullets – There are multiple statements regarding the interconnection of the groundwater systems and the harbor tidal system with reversing flow direction, but the most important conclusion statement has been left out: the net flow direction is from the Site to the harbor.

Page 2-5, last bullet extending onto page 2-6 – The statement concludes that any DNAPL present in the shallow soil above the peat layer near the south culvert is being contained by the sheet pile wall. This is an assumption as there is no specific information on the depth of the wall at this location or its current state of integrity.

Page 2-7, last full paragraph – No information has been presented on the expected ability of the active FPRS to recover a highly viscous, non-polar, separate phase liquid. FPR systems have not been shown to substantially remediate sites with DNAPL. They are moderately effective at removing DNAPL that enters the wells or trenches used for recovery, but not effective at promoting significant flow of DNAPL from the formation to the recovery system.

Page 3-4, Section 3.4 OU3, third paragraph – The discussion concludes with the statement on a potential discharge of groundwater with elevated contaminant concentrations. The mass flux evaluation approach presented for the bedrock system in Section 3.5 should be applied to the overburden system to estimate contaminant loadings to the harbor.

Page 3-5, third bullet – Why is achieving a "stable" plume in bedrock groundwater a remedial action goal when in the current (and likely stable) form of the plume is resulting in a significant discharge of contaminants to the harbor?

Page 3-6, first full paragraph – The method for determining the hydraulic gradient is unclear; it refers to a mean, but only notes one low and high tide figure. The most appropriate approach would be a time weighted average over several tidal cycles representative of spring and neap tides.

Page 3-8, conclusions of the mass flux evaluation – A key finding of the mass flux evaluation is not presented – over 260 pounds of TCE are estimated to be released annually from the Site through the bedrock groundwater system.

Page 5-1, second paragraph – Provide more detail on the verbal/numerical rating method; were the ratings provided by a single individual, multiple individuals as a group or independently, scores averaged?

Page 5-8, 5.3.1.6, Benefits – Would all three alternatives afford the same potential for future site reuse or would there be more latitude with lower soil concentrations?

Page 5-8, 5.3.1.8, Non-Pecuniary – Wouldn't leaving higher soil concentrations in place (alternative OU3-A3) cause potential community concerns?

Page 5-9, 5.3.2.2, Reliability – As noted in the general comments, the reliability of the PRB cannot be stated with certainty.

Page 8-2 to 8-3, description of one-pass trenching - One-pass trenching is an excellent method of PRB installation, however it is unclear whether this method would be able to match the contours of the top of the bedrock and ensure a good "seal" along the top of the rock. The deep overburden will tend to be the zone that conducts the highest concentrations of DNAPL COCs. The remedy should include provisions to prevent a gap in the barrier at the bottom.